

A NEW SPECIES OF THE GENUS *SIMULIUM* FROM SICHUAN, CHINA (DIPTERA, SIMULIIDAE)

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Abstract A new species, *Simulium* (*Simulium*) *bifengxiaense* sp. nov., is described on the basis of reared adult, pupal and larval specimens collected from Bifengxia Scenic Area, Sichuan, China. It is assigned to the *multistriatum* species-group of subgenus *Simulium*. The new species is characterized by the special shape of male genitalia. The type specimens are kept in Guiyang Medical College, Guizhou, China.

Key words Diptera, Simuliidae, *Simulium* (*Simulium*), new species, China.

The *Simulium* is a large subgenus of genus *Simulium*. There are more than 460 described species in the genus (Adler and Crosskey, 2012), and 110 species are recorded from China (Chen & An, 2003; Chen, 2007). In this paper, another new species, *Simulium* (*Simulium*) *bifengxiaense* sp. nov., is reported. The type specimens are kept in Guiyang Medical College, Guizhou, China.

***Simulium* (*Simulium*) *bifengxiaense* sp. nov.** (Figs 1–16)

Female. Body length about 2.9 mm.

Head. Narrower than thorax. Frons black, shiny and with several dark hairs. Frontal ratio 5.5:3.6:7.9; frons-head ratio 5.5:24.1. Clypeus black, whitish grey dusted and with long black hairs. Antenna composed of 2 + 9 segments, brownish yellow. Maxillary palp with 5 segments in proportion of 3rd to 5th segments 4.5:4.9:9.9. 3rd segment with elliptical sensory vesicle, which is about 0.3 length of 3rd segment. Maxilla with 10 inner and 12 or 13 outer teeth. Mandible with 24 inner and 12 outer teeth. Cibarium with blunt median projection posteriorly and with a group of about 15 minute denticles near base of median projection.

Thorax. Scutum brownish-black, shiny, densely covered with yellow pubescence and also upstanding long black hairs on prescutellar region; when illuminated in front and viewed dorsally, scutum with 5 nonpruinose longitudinal vittae, all vittae united with broad transverse band on prescutellar area. Scutellum dark brown, covered with long brown hairs. Postpronotum brownish-black, shiny, grey pruinose and bare. Pleural membrane and katepisternum bare. Legs. Almost yellow except hind trochanter, apical

cap of fore femur, apical 1/5 of mid femur and apical 2/3 of hind femur, apical 1/4 – 1/3 of all tibiae, which are brown black; all tarsi brown black except basal 2/3 of mid basitarsus, basal 1/3 of hind basitarsus and basal 1/2 of 2nd tarsomere, which are yellow. Fore basitarsus somewhat dilated distally, about 4.5 times as long as wide. Hind basitarsus nearly parallel-sided, about 5.4 times as long as its greatest width. Calcipala and pedisulcus well developed. All tarsal claws simple. Wing. Costa with dark spinules and hairs; subcosta haired; basal portion of radius bare. R₁ with black spinules and hairs; hair tuft on stem vein brown.

Abdomen. Basal scale brown with fringe of brown hairs. Terga brownish black except tergum 2 dull yellow, with dark hairs. Genitalia. Sternitum 8 bare medially, with about 25 long black hairs on each side. Anterior gonapophyses subtriangular, membranous, with several short setae and numerous microsetae on each side, their inner margins nearly parallel. Genital fork of inverted Y-shaped, with well sclerotized stem; each arm with strongly sclerotized projection directed forward. Paraproct and cercus of moderate size. Spermatheca somewhat oval in shape and unpatterned.

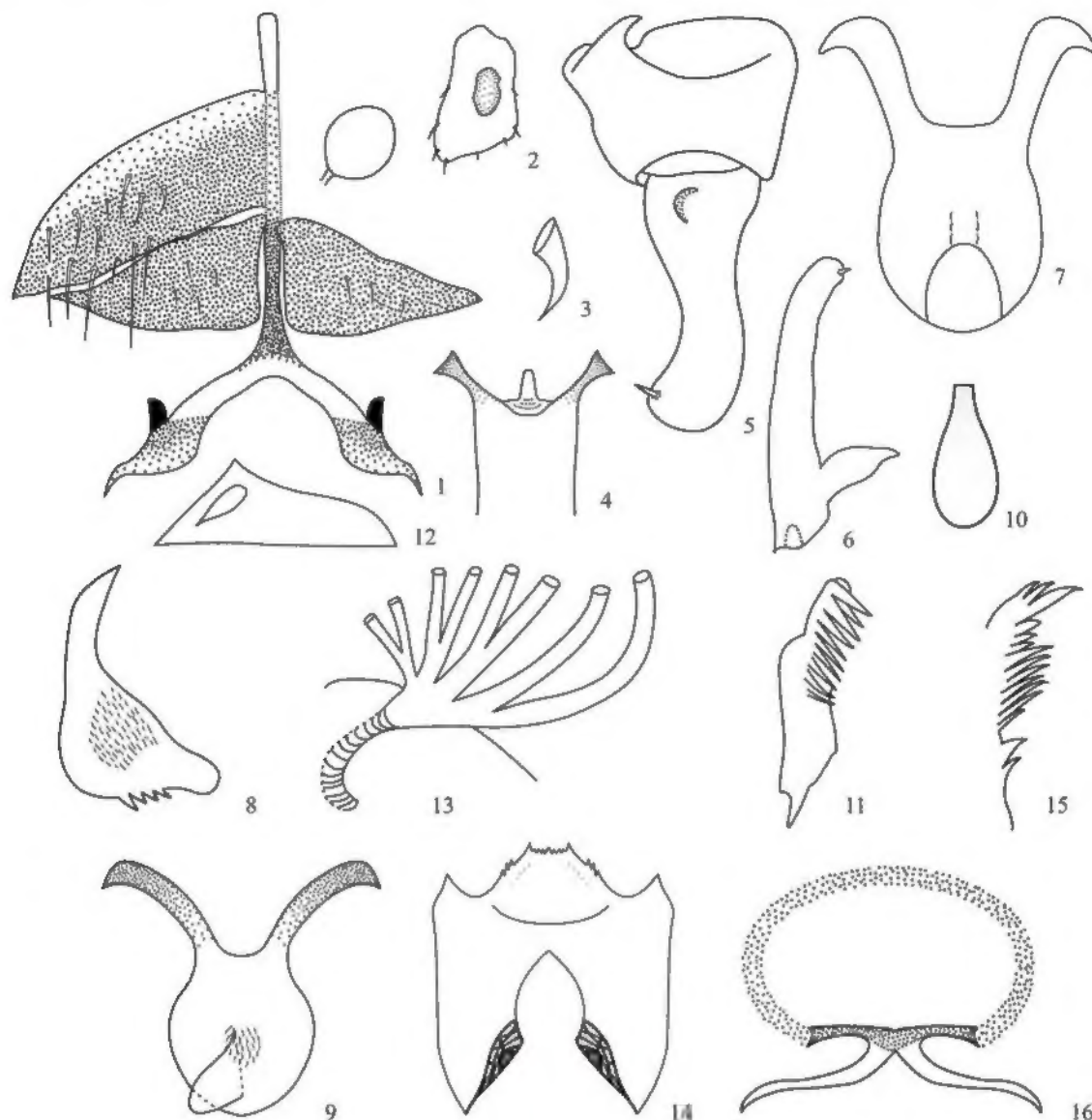
Male. Body length about 3.0 mm.

Head. As wide as thorax. Upper eye consisting of 18 vertical columns and 17 horizontal rows of large facets. Clypeus brownish black, whitish grey pruinose, moderately covered with long black hairs. Antenna composed of 2 + 9 segments, brownish black except scape, pedicel and base of 1st flagellar segment brownish yellow; 1st flagement about 1.9 times as long as length of following one. Maxillary palp composed of 5 segments; 3rd segment of normal size;

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Figs 1 – 16. *Simulium* (*Simulium*) *bifengciaense* sp. nov. 1 – 4. Female. 1. Genitalia. 2. Sensory. 3. Claw. 4. Cibarium. 5. Coxite and style of male. 6. Style in medial view. 7 – 8. Ventral plate. 8. Lateral view. 9. End view. 10. Median sclerite. 11. Postgonite. 12. Cocoon. 13. Filaments. 14. Larval head capuscles. 15. Larval mandible. 16. Larval anal sclerite.

sensory vesicle small, which about 0.2 length of 3rd segment.

Thorax. Scutum brownish black, shiny, whitish grey pruinosity, densely covered uniformly with whitish yellow pubescence and also upstanding long black hairs on prescutellar area. Scutellum with several upright black hairs as well as yellow short hairs. Postpronotum dark and bare. Legs. Almost brownish black except fore and mid coxae, basal 1/3 of fore femur, base of mid femur and basal 1/3 of hind femur, median large portion on the outer surface of fore tibia, basal 2/3 of mid tibia and base of hind tibia, basal 1/2 of mid basitarsus and basal 2/5 of hind basitarsus, which are yellow. Hind basitarsus somewhat inflated, spindle-shaped, about 3.8 times as long as its greatest width. Wing. As in female except

subcosta bare.

Abdomen. Nearly as in female. **Genitalia.** Coxite rectangular in shape. Style in ventral view nearly 3.0 times as long as its greatest width near basal 1/3, becoming narrow gradually from basal 1/3 towards apex, flattened ventrodorsally towards apex and with an apical spine. Style in medial view with long horn-like subbasal protuberance pointed dorsally which has no spine on anterior surface. Ventral plate in ventral view pear-like in shape, with a tongue-like projection, narrowed basally and rounded at tip. Ventral plate in lateral view with serrated posterior margin and a lot of minute setae; basal arm slightly diverged from each other. Postgonite each with about 10 large strong hooks. Median sclerite plate-like, widened from base toward near tip and with round apex.

Pupa. Body length about 3.0 mm.

Head and thorax. Integument yellow to brownish yellow, densely covered with minute tubercles. Head trichomes 3 pairs and thoracic trichomes 6 pairs, all usual simple. Gill with 8 in pairs arising near base, about 1/2 length of pupal body, each shortly stalked, and stalks of dorsal and ventral pairs widely diverged forming an obtuse angle of 130° degrees; all filaments subequal in length, but upper pair filament much thicker (about 2.0 times) than lower pair filaments.

Abdomen. Tergum 2 with 5 short and 1 long simple setae on each side; tegra 3 and 4 each with 4 hooked spines on each side; tergum 8 with spine-combs on each side; tergum 9 lacking terminal hooks. Sternum 5 with pair of closed together bifid hooks on each side; sternum 6 and 7 each with pair of inner bifid hooks and outer single hooks widely separated from each other. Cocoon. Wall-pocket shaped, thickly woven, with large anterolateral window on each side and moderate anterior margin.

Mature larva. Body length about 5.0 mm. Cephalic apotome with positive head spots. Antenna composed of 3 segments and apical sensillum, proportional lengths of 1st to 3rd segments 42.0:6.4:3.3; 2nd segment with a secondary annulation. Cephalic fan each with 40–42 main rays. Mandibular serration composed of large and small teeth but lacking supernumerary serrations. Hypostoma with row of 9 apical teeth of which medial and corner teeth moderately developed; lateral serration present on apical 1/2; hypostomial setae in number diverging posteriorly from lateral margin on each side. Postgenal cleft deep, subspear-shaped, pointed anteriorly and constricted at base, 3.0–4.0 times as long as postgenal bridge. Thoracic and abdominal integument bare. Rectal gill compound, each with 16–26 secondary lobules. Anal sclerite X-shaped, with anterior arms about 0.5 length as long as posterior ones. Ventral papillae absent.

Holotype ♀, reared from pupa. Slide-mounted together with its associated pupal skin, was collected in fast-flowing small stream from Bifengxia, Yaan (30°09'N, 102°99'E; alt. 1 150 m), Sichuan, China, 10 Sep. 2003, HUANG Li and ZHANG Chun-Lin. Paratypes: 5 ♀♀, 7 ♂♂, 21 pupae and 9 larvae, same data as holotype.

Distribution. China (Sichuan).

Etymology. The specific name was given for its type locality.

Remarks. This new species seems to fall into the *multistriatum*-group of the subgenus *Simulium* by having the scutum with 5 longitudinal vittae, simple claws in the female, the style with long basal protuberance and ventral plate with toothed posterior margin in the male, and the pupa with 8 filaments arranged in pairs.

This new species is characterized by the male ventral plate pear-like in shape, which is with a tongue-like projection and many minute setae, it can be readily separated from all known species of *multistriatum*-group by the above character and several combinations of characters, such as *S. (S.) deothangense* and *S. (S.) demolaense* from Bhutan (Tokaok and Somboon, 2008), *S. (S.) hillycum* Maskey from Nepal (Maskey, 1989), *S. (S.) novolineatum*, *S. (S.) barraudi*, *S. (S.) dentatum* and *S. (S.) digitatum* from India (Puri, 1932, 1933) and *S. (S.) chongqingense* (Zhu and Wang, 1995) and *S. (S.) uncum* (Zhang and Chen, 2001) from China, *S. (S.) sakishimaense* (Takaoka, 1977) from Japan and *S. (S.) lampangense* from Thailand (Takaoka and Choochote, 2005).

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中国四川碧峰峡蚋属一新种（双翅目，蚋科）

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摘 要 记述碧峰峡蚋属蚋亚属 *Simulium* (*Simulium*) 多条蚋组 *multistriatum*-group 1 新种。模式标本存放于贵阳医学院生物学教研室。

碧峰峡蚋，新种 *S. (S.) bifengxiaense* sp. nov. (图 1~16)

隶属于蚋属蚋亚属多条蚋组。主要特征是雄虫生殖腹板梨形，后缘钝圆，具舌状腹突和众多细毛。根据这一独特特

征结合其它虫态的综合特征可与该组已知近缘种相区别。

正模♀；副模：5♀♀，7♂♂，21 蛹，9 幼虫。四川碧峰峡 (30°09'N, 102°99'E; 海拔 1 150 m)，2003-09-10，黄丽、张春林采。

词源：新种种名源自模式标本产地地名。

关键词 双翅目，蚋科，蚋属蚋亚属，新种，中国。

中图分类号 Q969.442.9

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